1-2016

Demo: Sensing gamers' emotions using physiological sensors

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DOI: https://doi.org/10.1145/2938559.2938576

Demo: Sensing Gamers' Emotions Using Physiological Sensors

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1. INTRODUCTION

Understanding emotions of gamers can benefit game designers in various ways. How gamers feel while they playing a game can be treated as valuable user feedback to improve the development process of that game. Sensing player emotions also enables game designers to create adaptive game that can adjust itself to provide best gaming experience based on player emotions. However, how to effectively evaluate emotions of gamers is still an open research challenge.

Two common techniques to evaluate emotional state are using self-assessments such as questionnaires or interviews, and to recognize expressed emotions by analyzing videos or images of facial expression, body languages, and gesture. Although the self-report approach is convenient and unobtrusive, it requires users' cognitive attention. The vision-based approach also has some drawbacks that users' expressions do not necessarily reflect what they actually feel and there is also concern about privacy as images of users are captured.

In this work, we implement *Jasper* [1], a system using on wearable physiological sensors to recognize emotions of gamers. Compared to the mentioned approaches, physiological sensors system can recognize emotions continuously without interrupting user experience. Moreover, the physiological signals are involuntary and mostly activated by the Autonomic Nervous System [2], which are useful to detect actual emotions and robust to expression manipulation (e.g. social making). The contribution of this work is to demonstrate the feasibility of using commodity and unobtrusive wearable biosensors to recognize mobile gamer emotions.

2. SYSTEM OVERVIEW

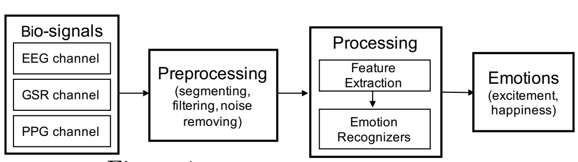

Figure 1: System overview diagram.

The overview of our system is shown in Figure 1. Input data is physiological signals from three channels including Galvanic Skin Conductance (GSR), photoplethysmography (PPG), and electroencephalogram (EEG) which are captured by commodity wearable sensors. The data is first preprocessed (e.g. segmenting, filtering) and then is used to compute meaningful features from various domains (e.g. time-series, frequency, geometric analysis, sub-band spectra). Our classification models are trained using data collected from 30 subjects to classify excitement (3-level) at an accuracy of 81.13% and happiness (binary state) at an accuracy of 84.91%. The output of out system is represented as a compound emotional state (e.g. happy and highly excited).

3. DEMONSTRATION

In our demonstration, we will allow voluntary participants to try our emotion recognition system in real-time. The physiological sensing devices we will use in the demonstration includes an Emotiv Epoc+ headset to measure EEG signals, a Shimmer sensing device, and a Microsoft band.

(a) Emotiv headset (b) Shimmer device

Figure 2: Sensing devices

Participants will first be asked to watch a one-minute video with relaxing natural scene and soothing music so that our system can capture the baseline of participants' physiological changes in relaxed state. After that, participants can select one or two games from the list of games that we prepared in our experiment mobile device or they can play some games on their own mobile devices. Each gameplay session will last from one to three minutes. We will briefly ask participants about their emotion for the purpose of collecting the ground truth. Our system will present the recognized emotional state corresponding to the gameplay session, and then we will ask participants to confirm whether the result of our recognition system reflects their emotion correctly. We will also show the extracted physiological patterns of both video and gameplay sessions from each sensing channel to demonstrate the potential of each biosensor device to be used as an indicator of gamer emotional states.

4. REFERENCES

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MobiSys'16 Companion June 25-30, 2016, Singapore, Singapore

ACM ISBN 978-1-4503-4416-6/16/06.

DOI: http://dx.doi.org/10.1145/2938559.2938576